

REMARKS

This application has been carefully reviewed in light of the Office Action mailed on November 4, 2002. Claims 56, 59, 61-62, and 72-123 have been canceled. Claims 124-125 have been added. The application now contains claims 55, 57-58, 60, 63-71, and 124-125. Claims 55 and 60 have been amended. A marked-up version of these claims, showing changes made, is attached hereto as Appendix A. Reconsideration of the above-referenced application in light of the amendments and following remarks is requested.

Claim 55 has been amended to recite in pertinent part “a capacitor comprising an electrode having a layer comprising platinum-rhodium material and a non-oxide layer comprising platinum material on top of the platinum-rhodium layer.” Support is found in Applicants’ Figs. 1 and 5-7, and pages 13-16 of the Specification.

Claim 60 has been amended to maintain proper dependency. Specifically, dependent claim 60 now depends from independent claim 55.

Claim 124 has been added to incorporate the limitation found in original dependent claim 61 as suggested by the Office Action. In particular, claim 124 recites a memory cell comprising “a capacitor comprising an electrode having a titanium layer beneath a platinum-rhodium layer and a platinum layer on top of the platinum-rhodium layer, wherein a titanium nitride layer is provided beneath the titanium layer.”

Similarly, claim 125 has been added to incorporate the limitation found in original dependent claim 62 as suggested by the Office Action. In particular, claim 125 recites a memory cell comprising “a capacitor comprising an electrode having a titanium nitride layer provided beneath a platinum-rhodium layer and a platinum layer on top of the platinum-rhodium layer, wherein the titanium nitride layer is from about 100 to about 150 Angstroms thick.”

Claims 55-57 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Okutoh et al. (U.S. Patent No. 6,180,974) (“Okutoh I”). Reconsideration is respectfully requested.

Okutoh I fails to anticipate the present invention. Okutoh I does not teach or suggest a memory cell with “a capacitor comprising an electrode having a layer comprising platinum-rhodium material and a non-oxide layer comprising platinum material on top of the platinum-rhodium layer,” as claim 55 recites. In Okutoh I, a platinum-rhodium layer is provided with at least a platinum-rhodium oxide layer on top (Figs. 6-8). Further, in Fig. 5, Okutoh I suggests a platinum-rhodium oxide layer with a ferroelectric film such as PZT on top rather than a platinum comprising material. Accordingly, Okutoh I fails to suggest or teach the limitations of claim 55. Claims 56 and 57 depend from and incorporate all of the limitations found in claim 55 and are at least allowable for the reasons set forth above. Accordingly, the rejection of claims 55-57 is solicited.

Claims 55-57 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Okutoh et al. (U.S. Patent No. 6,201,271) (“Okutoh II”). Reconsideration is respectfully requested.

Okutoh II fails to anticipate the present invention. Okutoh II does not teach or suggest a memory cell with “a capacitor comprising an electrode having a layer comprising platinum-rhodium material and a non-oxide layer comprising platinum material on top of the platinum-rhodium layer,” as claim 55 recites. Okutoh II states that an “alloy oxide film of platinum and rhodium is formed as an upper electrode so as to be put in direct contact with a ferroelectric PZT film.” (Abstract) (emphasis added). Further, a titanium nitride film 16 is placed on top of the platinum-rhodium layer rather than a layer comprising platinum. Accordingly, Okutoh II fails to suggest or teach the limitations of claim 55. Claims 56 and 57 depend from and incorporate all of the limitations found in claim 55 and are at least allowable for the reasons set forth above. Accordingly, the rejection of claims 55-57 is solicited.

Claims 58-60 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Okutoh II. Reconsideration is respectfully requested.

Claims 58-60 depend from and incorporate all of the limitations found in

independent claim 55 and are at least allowable for the reasons set forth above regarding Okutoh II. In particular, Okutoh II does not teach or suggest a memory cell with “a capacitor comprising an electrode having a layer comprising platinum-rhodium material and a non-oxide layer comprising platinum material on top of the platinum-rhodium layer,” as claim 55 recites.

In addition, there is no teaching or suggestion to change the thickness of the platinum layer. Okutoh II teaches forming the platinum layer 10 “to a film thickness of 1000 Angstroms as a lower electrode.” (Col. 5, lines 53-54). Okutoh does not teach or suggest a platinum layer that “has a thickness within the range of about 50 to about 150 Angstroms,” as claim 58 recites. This is an additional reason for the allowance of claim 58.

Moreover, there is no teaching or suggestion to change the thickness of the titanium layer. Okutoh II teaches forming the titanium film 8 “to a film thickness of 300 Angstroms.” (Col. 5, lines 47-48). Okutoh does not teach or suggest a titanium layer that “has a thickness within the range of about 60 to about 100 Angstroms,” as claim 60 recites. This is an additional reason for the allowance of claim 60.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

By 

Thomas J. D'Amico

Registration No.: 28,371

DICKSTEIN SHAPIRO MORIN &
OSHINSKY LLP

2101 L Street NW

Washington, DC 20037-1526

(202) 785-9700

Attorneys for Applicant

APPENDIX A

55. (amended) A memory cell, comprising:

a substrate;

a transistor including a gate on said substrate and a source/drain region in said substrate disposed adjacent to said gate;

a capacitor comprising an electrode having a layer comprising platinum-rhodium [layer] material and a non-oxide layer comprising platinum [layer] material on top of the platinum-rhodium layer, wherein the electrode has a lateral surface aligned with the source/drain region; and

a conductive plug providing electrical contact between the source/drain region and the lateral surface of the electrode.

60. (amended) The memory cell of claim [59] 55, wherein the titanium layer has a thickness within the range of about 60 to about 100 Angstroms.